

One Hundred Hungry Ants

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Grade Level: 4th

Mathematical Topics Explored: arrays, equal grouping, factors of a number, multiplication and repeated addition equations

Related GLCE's: N.ME.04.04 Find all factors of any whole number through 50, list factor pairs, and determine if a one-digit number is a factor of a given whole number.

Materials Needed: grid paper, square tiles, *One Hundred Hungry Ants* book, coloring utensils

Vocabulary: factor, array, product

Lesson Summary: Read the book *One Hundred Hungry Ants* to your class (an Elmo works well here to easily show the pictures), stopping periodically to predict what will happen next or to ask questions related to the story (i.e. why do you think the ants didn't decide to march in 3 rows?—they couldn't march in equal rows...there would be a leftover ant). At the end of the story, ask the students to work with a partner to determine all of the different ways that 12 ants could march in rows. Give each student (or each pair of students) 12 square tiles and encourage them to record the ways they find (either by listing or in a table or by drawing their ways on grid paper—this is a chance to introduce the word array—it is important to note that the ants always march in equal rows...no leftover ants).

Once students have had a chance to explore, have them share their work with the class and make a master list of all of the different ways 12 ants could march in rows. If you record the ways from fewest rows to most rows, students will be able to see several nice patterns that are worth discussing (see below)

# of rows	# of ants (tiles) in each row
1	12
2	6
3	4
4	3
6	2
12	1

Students should be encouraged to notice:

- Product of number of rows and number of ants in each row is always 12 (makes sense since all the arrays were created with exactly 12 tiles)

- As the # of rows increases, the # of ants in each row decreases
- If you read the # of rows top to bottom it is the same as the # of ants in each row read bottom to top.
- Every array has a matching array that is just turned/rotated $\frac{1}{4}$ of a turn—some discussion may occur here about whether those arrays are really the same—do we need to list them both? In this context, I would say that 2 rows of 6 ants would look different marching down the road than 6 rows of 2 ants (if we think of rows as horizontal).
- During this discussion, you could also show the arrays for each possibility and introduce the word factor to describe the two dimensions of the array (or the number of rows and the number of ants in each row)
- This is also a good time to write a multiplication and a repeated addition sentence for each array to reinforce the connection between these equations and the arrays.

If time permits, have students find all of the arrays that are possible with 20 ants or 24 ants.

Reflection/Assessment: Depending on time remaining and your typical classroom practices, you could have students answer a ticket out the door related to the number of arrays for a particular number of ants or ask students to write in a journal (i.e. How can arrays help you find factors of a number? How are multiplication and addition related to each other?...)